WARM UP:

p. 476 #3, 5

p-value = the probability of getting our sample (or something more extreme) if the claim is still true.

p. 476 #3, 5

3) Letter (D) is the only correct response. It is the definition of a p-value.

Ho: $p = 0.30$
Ha: $p < 0.30$

5) Ho: p = 70%
Ha: p > 70%

p-value = 0.27

The p-value is very large, so we fail to reject the Ho and say that we think the percent is equal to 70%. Therefore the new medication did not increase relief. It is equally effective as the old med.

HW: p. 476 #4, 10, 17, 19

HOMEWORK:

4) Ho: $p = 1/6$ ** p = percent of 6's

Ha: $p > 1/6$

p-value = 0.03

letter (d) is the correct conclusion.

10) Ho: $\hat{p} = 0.90$ -1

Ha: $\hat{p} \neq 0.90$ -1

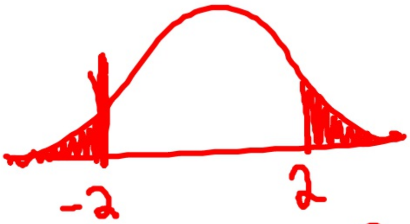
Conditions: SRS, ~~750>10~~ np, nq > 10   pop > 10n   Statement -2

-2.5

$\hat{p}$ = 657/750 = 0.876; $SD(\hat{p}) = \sqrt{\dfrac{\cancel{(0.88)(0.12)}^{(0.90)(0.10)}}{750}} = 0.012$

-1/2

$Z = \dfrac{0.876 - 0.90}{\cancel{0.012}} = -2$ -1



-1   -1

2· P(Z < -2) = ~~0.977~~

-4

~~There is more than a 97% chance that the stated percentage is correct for this region.~~

17) (a) Ho: $p = 0.63$

Ha: $p > 0.63$

$p = 0.63$

$n = 240$

$\hat{p} = 163/240 = 0.679$

(b)

STATE:	CHECK:
- SRS	stated representative
- $np \geq 10$	$(240)(0.63) \geq 10$
$nq \geq 10$	$(240)(0.37) \geq 10$
- pop $\geq 10n$	there are more than 2400 students that use LSATisfaction training

Conditions met --> Normal Model --> 1 prop Z test

$$Z = \frac{0.6792 - 0.63}{\sqrt{\frac{(0.63)(37)}{240}}} = 1.571$$

P(Z > 1.571) = normcdf(1.571, E99, 0, 1) = 0.0581

We fail to reject Ho because p-value of 0.0581 is greater than $\alpha = 0.05$. We have insufficient evidence that the true % of law school applicants who were admitted after taking the training program is greater than 63%.

(c) No. There is no evidence that the program increased the % of people who were admitted to law school.

19) (a) Ho: $p = 0.20$

Ha: $p > 0.20$

$p = 0.20$

$n = 22$

$\hat{p} = 7/22 = 0.318$

pop=150

(b) <u>STATE:</u> | <u>CHECK:</u>

- SRS	will have to assume representative
- $np \geq 10$	$(22)(0.20) \geq 10$
$nq \geq 10$	$(22)(0.80) \geq 10$
- pop $\geq 10n$	there are NOT more than 220 cars in the fleet

We can NOT use our Normal Model for our 1-Prop Z-test

If you proceeded anyway...

$$z = \frac{\hat{p} - p}{\sqrt{\frac{p \cdot q}{n}}} = 1.383$$

P(Z > 1.383) = normcdf(1.383, E99, 0, 1) = 0.0833

We fail to reject Ho b/c P-value of 0.0833 is greater than our alpha of 0.05. We have insufficient evidence that the true % of cars that fail emissions testing is greater than 20%.

CH. 20 PRACTICE

BOOK PROBLEMS:

p. 477

#12- add letter (g) create an appropriate conf. interval

#14- add letter (f) create an appropriate conf. interval

#20 (why can't you do this one?)

12) (a) Ho: $p = 0.05$

Ha: $p > 0.05$

$p = 0.05$

$n = 384$

$\hat{p} = 46/384 = 0.1198$

(b) Conditions:

- SRS	assumed representative
- $np \geq 10$	$19.2 \geq 10$
$nq \geq 10$	$364.8 \geq 10$
- pop $\geq 10n$	there are more than 3840 children

Conditions met --> N(0.05, 0.01112) --> 1-Prop Z-test

12) (c)

$$Z = \frac{0.1198 - 0.05}{\sqrt{\frac{(0.05)(0.95)}{384}}} = 6.275$$

$P(Z > 6.275) = 1.754 \times 10^{-10}$

(d) The probability of getting a sample where 11.98% or more of the children show abnormalities is 1.754×10^{-10} , if the true % of abnormalities has not changed from 5%.

12)

(e) We reject Ho b/c P-value of 1.754×10^{-10} is $< \alpha = 0.05$. We have sufficient evidence that the true percent of children with abnormalities is above 5%.

(f) We cannot say there is a cause and effect relationship. We can only say that our sample gives us strong evidence that the % of abnormalities has increased from 5%.

(g) Confidence interval: 90%

conditions met --> N(0.1198, 0.0166) --> 1 prop Z Interval

$0.1198 \pm (1.645)(0.0166) = (0.09254, 0.14705)$

We are 90% confident that the true percent of children with abnormalities is between 9.254% and 14.705%.

14) (a) Ho: $p = 0.31$

Ha: $p \neq 0.31$

$p = 0.31$

$n = 8368$

$\hat{p} = 0.32$

(b) Conditions:

- SRS	assumed representative
- $np \geq 10$	$(8368)(0.31) \geq 10$
$nq \geq 10$	$(8368)(0.31) \geq 10$
- pop $\geq 10n$	there are more than 83680 students

Conditions met --> $N(0.31, 0.0051)$ --> 1-Prop Z-test

14) (c)

$$Z = \frac{0.32 - 0.31}{\sqrt{\frac{(0.31)(0.69)}{8368}}} = 1.9836$$

2*P(Z > 1.9836) = 0.0473

(d) We reject Ho b/c P-value of 0.0473 is less than our alpha of 0.05. We have sufficient evidence that the true % of mothers who have graduated from college is not 31% anymore.

(e) No. The P-value is only slightly below alpha.

(f) confidence level: 95%

conditions met --> N(0.32, 0.0051) --> 1 prop Z Interval

$0.32 \pm (1.96)(0.0051) = (0.31003, 0.33002)$

We are 95% confident that the true percent of mothers who have graduated from college is between 31.003% and 33.002%.

20) the np and nq $\geq$ 10 condition is not satisfied, therefore we cannot proceed with the test

We would need a larger sample size if we wanted to proceed

Full credit on tests...

* Get out a blank piece of paper
* Close your notes
* Get out your formula sheet
* Complete #27 in book
    - on your own, silently
    - no help from me or classmates

27) (a) Ho: $p = 0.103$
Ha: $p > 0.103$ 2

$p = 0.103$
$n = 1782$
$\hat{p} = 0.1178$

(b) Conditions: 3

- SRS	assumed representative
- $np \geq 10$	$(1782)(0.103) \geq 10$
$nq \geq 10$	$(1782)(0.897) \geq 10$
- pop $\geq 10n$	there are more than 17820 high school students

Conditions met, Normal Model, 1-Prop Z-test 2

$$Z = \frac{0.1178 - 0.103}{\sqrt{\frac{(0.103)(0.897)}{1782}}} = 2.0616$$

$$P(Z > 2.0616) = 0.0196$$

We reject Ho b/c P-value of 0.0196 is less than our alpha of 0.05. We have sufficient evidence that the true % of high school dropouts is greater than 10.3%. There is evidence that the dropout rate is increasing.